Environment Ontario

legacy

Vol. 10, No. 3 November-December 1981

They came, they saw, they learned...

Photo: Hans Eijkenaar

Environment Ontario Minister Keith Norton and Senator Mel Frederick from Minnesota, member of one of the U.S. delegations that toured Ontario areas affected by acid rain, discuss the problems that worry the populations of both jurisdictions. **(see report and more photos on pages 3, 6, 7.)**

Ontario cottagers know why they catch fewer, or no fish at all, in their lakes in the Haliburton and Muskoka areas. They also know that the bigger part of the acid rain that slowly destroys their beloved waters originates south of the border.

But are the originators of the problem aware of what their industries are doing? Are their politicians, legislators and administrators?

And if they aren't, how do we best get the message across? That was one of the main questions Environment Canada, Environment Ontario and Canada's Department of External Affairs top executives asked themselves at their meetings on the acid rain problem.

The answer was: Let them see for themselves.

Its validity was confirmed in the reports of Ontario scientists who participated in symposia held on the subject at U.S. universities.

It resulted in a decision to bring a number of Americans carrying influence in U.S. politics and in the U.S. administration to Ontario, and to give them a first-hand look at affected areas, explained Walter Giles, Environment Ontario assistant deputy minister.

George Rejhon, environmental coordinator at the Canadian embassy in Washington, suggested that U.S. congressional aides be invited. Congressional aides are advisors to congressmen and senators and carry a voice on the committees of the U.S. legislature, where decisions are made.

The embassy contacted a number of aides and found them interested in the project. So many of them accepted the invitation that two tours had to be organized for them.

But not all decisions are made in Washington. Another important political factor is state legislatures, and a separate tour was organized for State legislators.

over Sudbury smelters

To reach as wide a section of the U.S. public as possible, a number of journalists writing for large U.S. publications and for wire services were also invited.

The itineraries arranged for the groups varied slightly, mainly because of changing weather conditions. But all participants were flown in small and medium sized aircraft at low altitudes over affected areas.

One flight over Sudbury showed what damages were done to the environment when SO_2 was pumped liberally into the air from ore roasting beds — the large moonscape sectors well visible

(continued on pg. 3)

Ontario provides grants for waste recycling

Domestic garbage collection and the recycling of waste separated in Ontario homes may become more efficient under a program of financial and other incentives for municipalities and private organizations announced by Environment Ontario assistant deputy minister J. Walter Giles.

The program is designed to reduce the quantity of waste sent to landfill and to ease the recovery of materials from waste through source separation.

Its objectives are to:

- Encourage demand for secondary materials through financial incentives;
- Initiate and fund research and demonstration projects of alternative source separation techniques;
- Encourage municipalities to adopt multi-material source separation programs;
- Provide financial incentives to municipalities, private companies or volunteer organizations to encourage implementation or continued operation of viable source separation programs;
- Monitor the quantity and quality of recovered materials, their markets and the costs of recovery; and
- Ensure proper recognition of the material and energy savings of source separation.

"As everyone is responsible for the generation of waste, everyone should also participate in its reduction," Mr. Giles said. A characteristic of source separation is the requirement for direct participation by the individual in solving the problem. This is likely to lead to an increasing awareness of the need for conservation, and for measures aimed at reducing the quantity of waste produced.

The practical package for assisting municipalities, private companies and non-profit groups includes financial support and non-monetary support.

Non-refundable grants are available for a limited period of time as follows:

- Up to 50 per cent of the cost of preparing and submitting a satisfactory feasibility proposal. If the proposal is financially sound, additional funds can be provided.
- Operational deficits during the two- to three-year start-up period may also be covered. The grants may cover operating expenses, overheads and land, building and equipment costs.

On the non-financial side, the ministry offers assistance by providing technical information and planning services, promotional materials, guidelines on how to set up a source separation program, by monitoring programs, on-going research to improve effectiveness and assistance in the marketing of the recovered material.

The province will also encourage an increase in demand for recovered materials to replace and/or supplement use of virgin materials and may also initiate and fund research and demonstration of alternative systems for source separation.

The source separation monitoring program will regularly issue information on the quantity of waste materials recovered and recycled, costs of recovery and cur-

(continued on pg. 5)

Gérard J.M. Raymond appointed deputy minister

Gerard J.M. Raymond

Ontario Premier William G. Davis has appointed Gérard J.M. Raymond as deputy minister of the Ministry of the Environment. Mr. Raymond succeeds Graham W.S. Scott, who has been appointed deputy minister of the Ministry of Health.

Before his appointment, Mr. Raymond had been deputy provincial secretary of the Secretariat for Resources Development since January, 1980.

Born in Verner, Ont., Mr. Raymond is a graduate of Sacré-Coeur College in Sudbury and of the University of Ottawa. After graduation he taught in secondary schools at Elliot Lake and Sturgeon Falls and became founding principal of Confederation Secondary School in Val Caron (Sudbury) and in Welland.

Mr. Raymond was appointed superintendent of French language schools for the Niagara Board of Education, Welland, in 1969 and joined the Ontario civil service as education officer with the curriculum services branch of the Ministry of Education in 1972.

From 1974 to 1977 he was chairman of the Council of French Language Schools and from 1977 to December 1979 assistant deputy minister of the Council for Franco-Ontarian education.

Mr. Raymond lives with his wife, the former Desanges Poirier, and their three children in Agincourt.

It's all one world...

Sewage fouls some of Britain's best beaches

After more than 20 years of campaigning, Britain's Coastal Anti-Pollution League has not had much success. The league's most recent report states that 190 of 633 beaches surveyed, including some at major resorts, are at risk from sewage pollution.

More than 50 per cent of the sewage outfalls around the British coastline serving about 6 million people discharge crude sewage onto beaches or into shallow water.

In addition, much of the crude sewage brought to the sea by the Severn, Humber and Mersey Rivers washes up at resort beaches in the area with incoming tides and onshore winds.

As a classic example, the report names New Brighton Beach. Visited by some 4 million people on summer weekends in the early 1900s, the beach is now covered with sand-coated fecal matter and half of the renowned town's centre is boarded up.

The difficulties in the control of seashore pollution were recently expressed by Geoffrey Stanfield, scientist with the British Water Research Centre, reports New Scientist.

Fecal solids seem particularly resistant to disintegration in seawater, Stanfield said. They also are buoyant and are carried by onshore breezes to the shore even from relatively long outfalls. Immediate action is required in the form of screening and comminution of sewage before outfall.

Aside from the esthetic impact there is the invisible bacterial pollution. European Common Market directives set a bacteriological limit for bathing areas at 10,000 coliform bacteria or 2,000 fecal coliform bacteria per 100 millilitres of sea water.

No national survey of bacteria counts on England's beaches has been published, but in Wales it was found in 1978 that of 330 beaches only 190 complied with the directives. The cost of improving 20 of these beaches to standard was then estimated at $450 million.

(In Ontario, water containing more than 100 fecal coliform bacteria per 100 ml is considered hazardous to the health of swimmers and water with more than 1,000 total coliform bacteria per 100 ml is considered impaired.)

No studies on the health impact of bacteriological contamination of beaches has been done in England since 1959 when the country's Medical Research Council reported that "unless water is so fouled up as to be esthetically revolting there is little evidence that bathing in the sea contaminated with sewage is a risk to public health."

In contrast to this opinion, the U.S. Environmental Protection Agency found in a survey of 30,000 bathers and non-bathers in the New York-Boston area a strong link between bacterial counts and the health of swimmers.

Only eight cases of intestinal disease per 1,000 swimmers were reported when the enterococci bacteria count was 10 per 100 ml. At a count of 100 bacteria per 100 ml, the cases of disease rose to 30 and at 1,000 bacteria per 100 ml to 50 cases per 1,000 swimmers.

Gasohol is not all roses

The use of alcohol as automobile fuel, vigorously promoted in Brazil since 1975, has led to a number of unforeseen environmental and social problems, reports Jose Lutzenberger, a Brazilian agronomist.

As raw material for the production of alcohol, molasses from sugar cane is used, but in the long term the sugar will be derived from the root of the cassava plant.

To promote the development of cassava, the Brazilian government offered cheap loans to large producers. The producers then cleared large tracts of land by the use of chemical defoliants and by burning forests.

To keep the land productive, large amounts of fertilizers and pesticides were needed.

The waste left after the alcohol production, a highly concentrated organic "soup", was dumped into rivers, causing excessive growth of algae and water-weeds over large areas.

The vast new plantations also displaced small farmers who ended up adding to the overpopulation of the crowded slums found in every large Brazilian city.

Renewables are expensive

Spreading use of renewable energy sources, especially in the developing world, could be as destructive to forests, water tables and soil as a nuclear war, claims Maurice Strong, former secretary-general of the United Nations Environmental Program (UNEP). "Renewables are expensive in economic, social and environmental ways," Strong said.

It is often difficult to see the dangers new energy technologies present. The use of biomass — wood fuels, biogas, alcohol — can increase the rate of depletion of forests and lead to the creation of deserts, alter water tables and compete with food crops for limited financial and technical resources.

To avoid destruction of other vital resources, the study of the environmental impact must stand at the start of any new energy projects.

Wondrous ways of nature

Man will probably never be able to fathom the ramifications and intricacies of the ecology of living things, as two recent examples show.

Ecologists have for some time accepted the fact that the dodo became extinct about 1680, and so have the inhabitants of the bird's former habitat, the island of Mauritius.

It is only now, however, that they discovered that a long-lived species of trees on the island is following in the dodo's footsteps. The species is dying out, too, probably because its seeds depended on the dodo's intestinal juices to soften them up for germination.

An ecological event of the opposite direction is happening in Portugal. There, the government is about to stop a reforestation project to preserve the habitat of 40 of the country's last Iberian lynxes.

In the reforestation program, areas in the Malcate hills on the border of Spain and Portugal were being cleared of scrub that had grown since the forests fell to the axe.

The scrubs, however, have since become the habitat of the lynxes' preferred food, rabbits. To preserve this food supply for the vanishing species, reforestation must now be prohibited on about 3,500 hectares and strictly regulated on 2,000 more.

Blunder spreads medfly

The spread of the Mediterranean fruit fly that struck terror among California fruit growers recently was caused by a blunder, said Jerry Scribner, head of the fruit fly eradication program.

The original plan was to sterilize 50,000 fruit flies and release them onto the fields. The species mates only once and thousands of healthy flies would waste their attempts at fertilization on sterile partners. The technique worked before in the Los Angeles area and was expected to eradicate the pest from the Santa Clara Valley.

Unfortunately, the sterilization did not work and the flies the U.S. Department of Agriculture had bought in Peru were fully capable of fulfilling their natural functions.

In addition, the dye used to identify sterile flies in a separate program carried out in Hawaii was so close to the fly's natural color that agricultural inspectors mistook the fertile Peruvian flies for harmless Hawaiian ones.

The problem could have been corrected if the affected fields had been sprayed immediately on discovery of the blunder. But opposition from environmentalists and an indecisive bureaucracy delayed spraying until the flies completed their life cycle and spread well beyond the control area.

To prevent the spread of the fly to countries to which they export fruit, the growers are now forced to fumigate the fruit with ethylene dibromide, according to some experts one of the most carcinogenic pesticides known.

China likes oily bilges

Much of the pollution of the world's oceans by oil is caused by tanker captains who pump their richly contaminated bilgewater overboard. Regulations against the habit have little effect, as few seaports provide facilities that would accept this oil-saturated bilgewater.

However, the Chinese Ministry of Communications has come up with a good solution. Some Chinese harbors now actually welcome the tankers' bilgewater, store it in settling tanks and skim the oil off. This is then processed in small refineries for sale in the country. The tankers are also charged for the disposal of their bilgewater.

The Chinese claim they have recovered the capital outlay for these facilities in three years.

Thames reversed

London's water supplies are running low and the British Thames Water Authority is considering a plan that would turn the tidal reaches of the Thames into a freshwater lake and an additional source of water for the expanding metropolis.

The plan is based on a $1 billion barrier originally designed by the Ministry of Agriculture to prevent floods in the London area. This barriers could as well keep fresh water in, saltwater out and provide a good freshwater reservoir, if effluent from the London sewage works could be kept out of it.

Less fallout

The level of radioactive fallout in the atmosphere in 1980 was less than one per cent of the peak reached in 1963-64, reports the UK Atomic Energy Authority. The Chinese bomb test of October, 1980, accounts for about half of this radioactivity.

Seepage expensive

The single major reason for the skyrocketing costs of sewage systems are infiltration and inflow, testified R.G. Petroff of American Digital Systems Inc. before a U.S. government public works committee. A 65-city survey done by his company found that more groundwater flows into sewers than sewage.

During high groundwater conditions, this infiltration and inflow may amount to 166 gallons per day per person, compared to 70 gallons of wastewater.

EPA finds 9000 sites

The U.S. Environmental Protection Agency has identified 9,000 hazardous waste sites as possible targets for the monies provided for industrial dump clean-up. Of these, 900 "may be potentially serious", reports EPA.

Ministry of the Environment
Ontario

Hon. Keith C. Norton, Q.C.
Minister
Gerard J.M. Raymond
Deputy Minister

Published bi-monthly by the Ministry of the Environment, Information Services Branch, 135 St. Clair Avenue West, Toronto, Ontario, M4V 1P5 for those interested in the many facets of environmental enhancement. Reproduction of articles authorized without further permission. Second Class Mail Registration Number 4168

Editor ..... **Robert Koci**

Director of Information Services ..... **R.J. Frewin**

Minnows, clams, algae test Niagara water

Clams and algae have been added to minnows during the past year to augment the array of conventional instruments Environment Ontario scientists use to monitor the quality of the water of the Niagara River, endangered by municipal discharges and possible leakages of chemicals from industrial dumps in New York State.

Environment Ontario scientists have found that live animals and plants can detect the presence of a number of pollutants in water and can also aid in pin-pointing the sources of the contamination.

Of the three biomonitoring systems the one using young spottail shiners — a species of minnows — has been developed and used by Environment Ontario scientists in the Niagara River since 1975. It has proven itself to be a sensitive, efficient and reliable method in a variety of locations on the Great Lakes.

The young fish, about 50 to 60 mm in length, spend the first few months of their lives within about a square mile of their spawning ground. In September, Environment Ontario scientist Karl Suns collected juvenile spottail shiners from nine sites on the Niagara River.

The catch is deep frozen on site and delivered for analysis to the ministry's laboratory. The analysis of the whole fish can then indicate changes in levels of such contaminants as PCBs, mercury and other trace contaminants such as organochlorine pesticides, chlorobenzenes and dioxin. They can also narrow down the site at which the pollutants enter the river.

Freshwater clams of the species Elliptio Complanatus have been in use as biomonitors in other areas. Experimental use of the clams in the river in 1980 has shown, that they are very good indicators of the presence of trace quantities of organochloric pesticides and PCBs in water.

During the spring and summer of 1981 a sufficient amount of these 6.5 to 7 cm clams were harvested in the clean water of Balsam Lake.

The animals were then placed in groups of about 5-10 into plastic or metal cages and deposited at 15 locations along the shore of the Niagara River in about 2 metres depth.

Three weeks later the cages were

biomonitoring reveals pollutants

retrieved and replaced in certain locations by a new set of clams for a further three weeks exposure.

The retrieved clams are shucked on site, wrapped in aluminum foil, deep frozen and delivered to the ministry's laboratory for analysis.

Environment Ontario scientist Peter Kauss is co-ordinator of this project, which is carried out on contract to the ministry by a consulting engineering firm, Integrated Explorations, of Guelph.

In the vicinity of the sites used for the clam-test and fish collections, Environment Ontario scientist Mike Jackson collected in June, July and August samples of the green filamentous alga *Cladophora*, which grows in abundance attached to permanent waterline structures throughout the Niagara system.

Each sample was collected from a 50-100 m stretch of shoreline, wrapped in absorbant paper and shipped on ice to the ministry's laboratory for analysis of internal trace contaminant levels.

Cladophora accumulates heavy metals (mercury, lead, arsenic) and certain organic contaminants (PCBs) in concentrations well above levels normally found in water.

In comparison to *Cladophora* collected along remote shores of the Great Lakes, preliminary evaluation of Niagara River *Cladophora* has shown elevated accumulations of metals. The 1981 harvest is expected to confirm these preliminary findings and to indicate point sources of these loadings.

Environment Ontario's biomonitoring projects are in part supported by Environment Canada funding under the terms of the Canada/Ontario agreement on Great Lakes water quality and are conducted on both sides of the Niagara River in co-operation with the Niagara River Toxics Committee, an international body that includes representatives of Ontario, Canada, New York State and U.S. environmental agencies.

Underwater photo shows basket of clams on the bottom of the Niagara River. The clams bioaccumulate certain pollutants in their tissues and assist scientists in the determination of pollution levels.

(photo: Integrated Explorations)

Karlis Suns and Tim Sherin of Environment Ontario haul in a net of minnows.

Mike Jackson collects Cladophora found growing on rocks along the shores of the Niagara River.

They came, they saw...

(continued from pg. 1)

from the air showed what may be in store for acid rain affected areas in the future.

Low-level flights over the Muskoka, Haliburton and Killarney area lakes, over vividly green forests liberally sprinkled with sparkling blue lakes gave the visitors a picture of the parts of Ontario that are most affected.

The ground tours of damaged lakes and existing research facilities could not but impress the visitors about the seriousness of the acid rain problem. Their encounters with local citizens, municipal, provincial and federal politicians brought them face to face with the deep concern of people.

The participation of Ontario Environment Minister Keith Norton and Environment Canada's minister John Roberts in the project as well as the involvement of leading scientists in the discussions underlined the need for action and proved that the acid rain problem is not just a matter of U.S.-Canadian confrontation, but a real global problem.

"The results of the tours are very encouraging," said Mr. Giles, summing up the impressions he gained. "I am sure that all visitors have learned to realize that a serious acid rain problem exists. Even those who did not believe in our claims left with doubts about their own original attitude."

Some journalists participated in the hope that they would witness some dramatic manifestation. In this they were disappointed. Clear, blue lakes, arrays of scientific in-

no dramatic manifestations

struments, reams of computer print-outs simply are not dramatic.

But the size of the affected area, its richness in water resources, its unique character and its obvious value could not but leave a deep and lasting impression even on the most callous journalistic mind.

The effects of the visits are also becoming visible. Factual, well documented reports on the acid rain situation have appeared in a number of leading U.S. publications.

heard on the floor of Congress

Arguments that were voiced for the first time during the visits can now be heard on the floor of the U.S. Congress. Only a few months ago the sessions of the U.S. House of Representatives committee studying acid rain revealed a lack of urgency in tackling the problem. Now the committee is split sharply and the calls for action heard from its members appear to be louder.

Which indicated that, maybe, some time in the not too distant future the wheels may start turning to get the ponderous U.S. political and administrative machine moving toward a solution of this global problem.

Norton: acid rain affects people, too

Any doubts he may have had about the seriousness of the effects of acid rain were completely eliminated during his recent visit to Scandinavia, Environment Minister Keith Norton told a group of U.S. journalists touring Ontario's acid rain affected areas.

What Swedish and Norwegian environmental scientists and government officials discovered involves more than the death of entire fish populations with a resulting impact on surrounding wildlife, Mr. Norton said.

"They are documenting gradual contamination of ground water supplies through the leaching of heavy metals. This is caused by the acidification process.

"Levels of cadmium, for example, are so high that in some areas of Sweden the government warns its citizens to avoid consumption of parts of moose and elk. Their

toxic levels for infants

bodies have absorbed abnormally high concentrations of this metal from eating vegetation, which in turn has absorbed it from water.

"In one local hospital which relied on acidified water for its needs, levels of mercury, cadmium, copper and lead reached toxic levels for young infants. In at least three documented cases, kidney patients died from a high aluminum content in their bodies, which they received from the water used in the hospital's dialysis machines.

"For areas of Canada and the United States that are sensitive to acid rain, the implications of this could be staggering. Already our own scientists have documented heavy metal uptake by fish from lakes with low pH readings.

"Both Norway and Sweden have spent millions of dollars on experimental liming programs, to see if they can combat the effects on acid rain on a few hundred of their lakes. While they have reported favorable results in some lakes, they cannot foresee the chemical consequences of this artificial interference, nor can they predict if these beneficial effects will continue."

While Ontario is investigating liming as a possible stopgap mea-

international abatement only solution

sure for some threatened waterbodies, it is clearly recognized that the only solution is international abatement, Norton said.

"Here, too, is another parallel with Scandanavia's acid rain difficulties. Like Ontario, most of the pollution causing their problem comes from beyond their borders — from England and industrialized Europe. And while those countries have signed an initial agreement to cut back emissions, successful compliance has not yet been achieved. They are watching Ontario and Canada's battle closely and with great interest.

"During my visit, we agreed that there were ways Norway, Sweden and Ontario could assist each other. Sharing knowledge is already well under way."

Hundred outlets save glass for Joe

Joe Gauci is a "resourceful" man. He's running a business single-handed and conserving our environment at the same time, through glass recycling.

For the past year and a half, Joe has been running a company known as Glass Reclaimers of Canada.

Using about 600 Environment Ontario collection bins, Joe collects glass from 100 outlets across Toronto. His clients range from the Royal York Hotel to a church with a Saturday night dance (which yields an extraordinary amount of glass).

"The business doesn't have to be large," says Joe. "Everyone has to get rid of their left-over glass somehow." Joe takes the glass collected to Consumer's Glass, where it is recycled and made into new products.

Joe visits his bin locations once or twice a week, depending on the volume of glass generated by an outlet. When someone calls Joe to request his services, he takes one or more Environment Ontario bins to the site and that's the last of his client's glass disposal problems. There is no charge to the client.

Joe makes 25 to 40 pick-ups a day. And it's a tough job. "A bin full of bottles weighs about 200 pounds," says Joe." One full of smashed glass from a commercial glass outlet will weigh about 500 pounds."

As one of the very few glass collectors in Toronto, Joe is making a personal contribution to conservation. And as Joe says, "That's what it's all about."

Joe Gauci of Glass Reclaimers of Canada can be reached at 678-6697.

Joe Gauci empties a barrell of broken glass for future recycling.

"School by the Water" teaches about noise

Wendy James explains the use of a noise level meter to her pupils.

by Liane Faulder

"What is noise?" asked the teacher.

"It's people with radios and stereos running around at night and keeping us awake."

"It's buildings being torn down."

"It gives me a headache."

All this noise about noise is part of an innovative teaching program at Toronto's Harbourfront. It's called School by the Water, and it's designed to provide a stimulating new environment in which students learn from experience, not from books.

Teacher Wendy James used a noise level meter borrowed from Environment Ontario to explore the Harbourfront environment with students aged 9 to 13.

When the meter's microphone is pointed at a source, it measures the noise generated in decibels, a unit of sound intensity.

"The meter is an objective way of measuring noise," Wendy told her students, "because what is noise for one person may be music to another."

Illustrating her point, Wendy measured the noise generated by a student's large radio. She instructed him to turn the music up to the volume he would normally use. The noise meter measured 96 decibels. (A snowmobile roaring across winter terrain produces 100 decibels of noise.)

"Noise this loud can affect your hearing, and the hearing of others," said Wendy. The student looked sheepish.

When children learn through experience, the lesson is a more valuable one.

"This type of learning makes the kids really aware of their environment, and how it can be affected. Having the use of a piece of equipment like this is just great. The kids love it," said Wendy.

School by the Water runs all year long, and is usually booked by school groups, but individual children can also attend.

Selected lakes get lime treatment

An experimental lake neutralization study to test the short-term effectiveness of liming as an artificial buffer against acid rain is being undertaken jointly by the Ontario Ministries of the Environment and Natural Resources.

An initial $720,000 has been earmarked by the two ministries for the first year of the program, Natural Resources Minister Alan Pope and Environment Minister Keith Norton said.

Treatment will be concentrated on selected lakes in the Muskoka-Haliburton area and on several severely affected lakes in the Sudbury region.

"Our concern in Muskoka and Haliburton is to develop and assess ways of protecting and maintaining healthy fish stocks in lakes under stress from acid rain," Mr. Pope said. "We want the program to be developed carefully, to avoid undesirable side effects."

first attempt to protect

The study in the Muskoka-Haliburton area is one of the first attempts to protect, by artificial means, sensitive lakes which have not already been acidified.

"We hope to find if it is feasible to protect aquatic life in accessible lakes until a satisfactory abatement-at-source program to curtail acid rain becomes effective. This includes the expected and necessary air quality agreement on transboundary pollution between Canada and the United States," Mr. Norton said.

"Various techniques will be used in the experimental program, including the addition of calcium carbonate. It is not a matter of simply dumping tons of slaked lime or limestone into lakes, as some think.

"While the basic chemistry of 'liming' seems simple, lake neutralization is more complex in practice. It entails dealing simultaneously with all elements of life in the sensitive aquatic ecosystem."

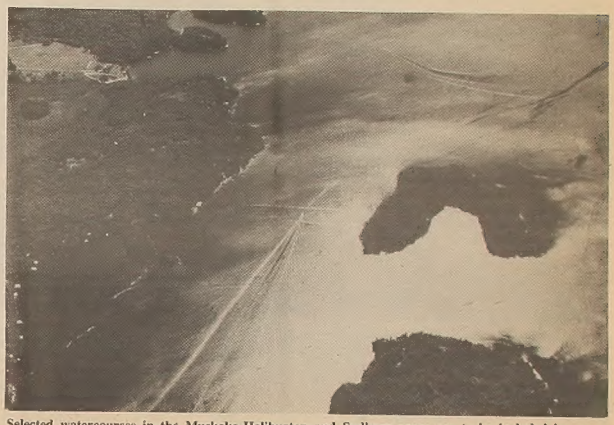
The purpose of the program is an experimental attempt to neutralize sensitive, acid-stressed lakes to pH levels non-harmful to aquatic life.

(The acidity or alkalinity of a waterbody, or of soil, is determined by a logarithmic scale of 0 to 14, which is a chemical measurement of the hydrogen concentration. Most regions of southern Ontario today are receiving rain of pH 4.0 to 4.5 compared to natural rain which has a pH of 5.6. A level of pH 4.0 is 40 times more acidic than pH 5.6, hence the accumulation of such acidic precipitation, over time, can severely affect aquatic life in sensitive lakes, such as those in the Muskoka-Haliburton, Parry Sound and Algonquin Park areas of the province. Sensitive lakes in Canada's Precambrian Shield are located on beds of granite rock, and not on limestone which is able to neutralize the acid, as in the Great Lakes.)

rehabilitation under scrutiny

The acid-stressed lakes to be treated have not yet been selected.

"A number are being examined for suitability in terms of evidence of damage, access, and important ecological values," Mr. Norton said.



Selected watercourses in the Muskoka-Haliburton and Sudbury areas are to be included in an experimental program using lime to neutralize acidity.

In the Sudbury region, the project will entail expanded research to rehabilitate several lakes already acidified. Liming experiments have been conducted on four acidified lakes in the region since 1973.

Mr. Norton said that waterbodies already severely damaged by acidification will not benefit quickly from abatement alone.

"Liming and other rehabilitation measures will help lake ecosystems recover, but long-term damage may mean the lakes cannot be restored to their original natural condition."

Although a limited number of lakes will undergo intensive experimentation under the program, research findings can be extrapolated to lakes under similar conditions of stress in other regions.

"The current research does not detract from Ontario's overall objective to effect a significant reduction of current levels of acid rain-causing emissions of sulphur and nitrogen oxides throughout North America," Mr. Norton said.

The experimental restoration project is an interim step to buy time. He pointed out that artificial neutralization entailed a costly continuing program, requiring repetitive treatment, with no assurance of being able to restore the natural ecology.

"We are going forward with this project now because it would take at least five to ten years to put effective abatement measures into place, even if agreement on actions were reached immediately."

The overall effectiveness, including the economics of the program, will be assessed by the participating ministries when the project ends in 1986.

Because of the complexities of neutralization of lakes having a number of species of fish, the ministries are not encouraging cottager associations to undertake liming of lakes until the results of the experimental program are known.

Enquiries about lake neutralization should be directed to the limnology section of the Ministry of the Environment or the fisheries branch of the Ministry of Natural Resources in Toronto.

Study seeks ways to improve Lake Simcoe

In 1965 you needed only a little bit of luck and you could pull a whitefish every two and a half hours through the hole you had cut into Lake Simcoe ice. In the late 70s you only had a chance to catch one if you spent more than five days and nights in your small fishing hut.

For catches of lake trout your chances of success have improved. The average number of man-hours required to catch one of these decreased between 1965 and 1978 from 358 to 80, but only because thousands of hatchery fish were and still are seeded into the lake every spring.

In contrast, warm-water fish thrive in the lake. The man-hours required to catch a fish of any species in the lake have declined from 1.2 in summer of 1968 to 0.6 hours in the summer of 1979 and 1 hour in the winter of the same year.

The reason for the decline of the populations of the desirable coldwater species is the excessive supply of phosphorus reaching the lake.

On land, phosphorus used as fertilizer promotes the growth of crops. Washed off fields and reaching the lake from the discharges of sewage treatment plants and leaking septic tanks, it promotes the growth of weeds.

Due to the lake's funnel-like shape, dead weeds end up in the deeper parts of the lake, where they decay. The decay requires oxygen which is taken out of the water.

In summer, cold water fish prefer the deep cold waters — but the oxygen depletion they find there places them under severe stress.

As the oxygen rich surface water cools in fall, it sinks to the bottom of the lake, restoring oxygen levels — but by then it is too late for many cold water fish.

three main programs

The survival of the cold water fish in Lake Simcoe depends therefore on a reduction of the phosphorus input into the lake, and the Provincial Government is committed to a program aimed at the reduction of this input from a projected 1983 loading of 105 tonnes per year to 85 tonnes per year.

To achieve this reduction, three main programs were initiated. Their task is:

- to reduce the phosphorus objective for effluents from the Barrie and Orillia sewage treatment plants form 1.0 milligrams per litre to 0.3 mg/l;

sewage diversion accelerated

- to direct the sewage from the Aurora and Newmarket sewage systems into the York-Durham sewer system for treatment at the Duffin Creek sewage treatment plant on Lake Ontario;
- to initiate a program aimed at the reduction of phosphorus loadings from non-point sources, that is from the seepage of phosphorus from farms and from storm sewers.

Of these programs, the studies of the Barrie and Orillia sewage treatment plants have been completed and reports are expected shortly.

The diversion of Aurora sewage to the York-Durham system has been accelerated and is expected to become effective in 1984.

To reduce non-point phosphorus loadings, the Lake Simcoe environmental strategy studies were started by Environment Ontario's water resources and pollution control branches and its central region office in cooperation with the South Lake Simcoe Conservation Authority. The major objectives of these three-year studies are:

- determination of the phosphorus budget of and the phosphorus loading from the Holland Marsh area;
- identification and evaluation of measures designed to reduce phosphorus loading from the marsh area;
- determination of sources of phosphorus loading from other agricultural areas in the Lake Simcoe basin;
- estimation of the phosphorus loads contributed by stormwater runoff under existing and projected levels of urban development;
- establishment of basic physical, chemical and biological data to allow the future evaluation of Lake Simcoe water quality, the determination of long range trends and measurement of the effectiveness of the remedial measures taken. Coordinator of the study is Wes Lammers of Environment Ontario's central region.

Grants for recycling

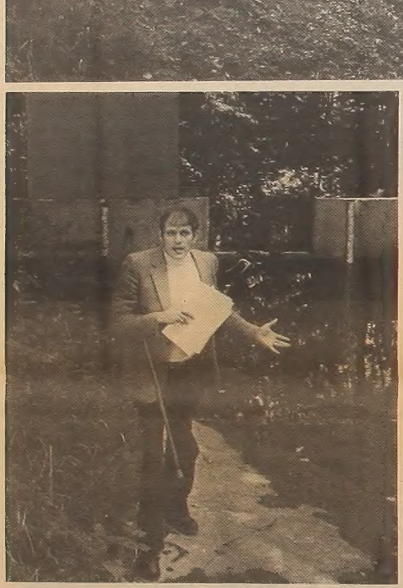
(continued from pg. 1)

rent market prices for the materials. The ministry will keep tabs on both the supply and demand, and enable material recovery program operators to set up or adjust their programs realistically. The government will also examine legislation for references to control the problems of mandatory source separation and scavenging of curbside material.

"My ministry is committed to source separation as a viable part of comprehensive waste management," Mr. Giles said. "However, I wish to stress that if source separation is to work effectively, a commitment by the province alone is not enough — municipalities must commit themselves, as must the program organizers and the public itself."

U.S. legislato get first hand

United States senators listen to Environment Ontario scientist Dr. Tom Brydges' description of the methods used to determine the acidity of a lake in the Muskokas. The senators were one of the groups of U.S. legislators, politicians and journalists invited by Environment Canada and Environment Ontario to get a first hand impression of the work done in Ontario to control the effects of acid rain.



Brydges: "The garbage can is full — we can't keep adding to it."

"Ontario is totally committed to winning the fight against acid rain. But we will also continue to take our case to the American people and where necessary to American courts and administrative tribunals," Ontario Environment Minister Keith Norton told U.S. legislators, journalists and congressional aides.

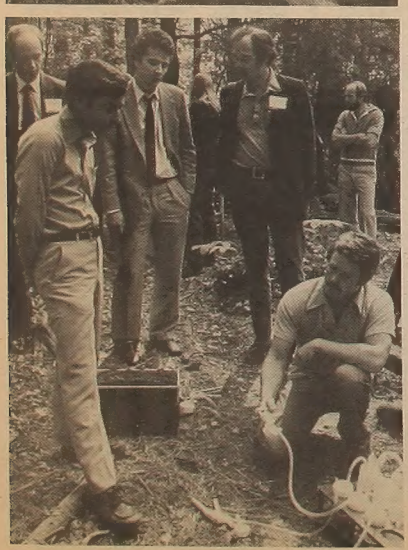
They had been invited by Environment Canada and Environment Ontario to a series of events designed to inform them and the U.S. public about the effects acid rain has on Ontario and research done in Canada on the subject.

Twelve congressional aides — environmentally interested advisors to U.S. congressmen — participated in the first visit. Later, 12 journalists from leading newspapers and syndicated news services fr Angeles, St. St. Paul, Buffalo and days with and Enviro tists.

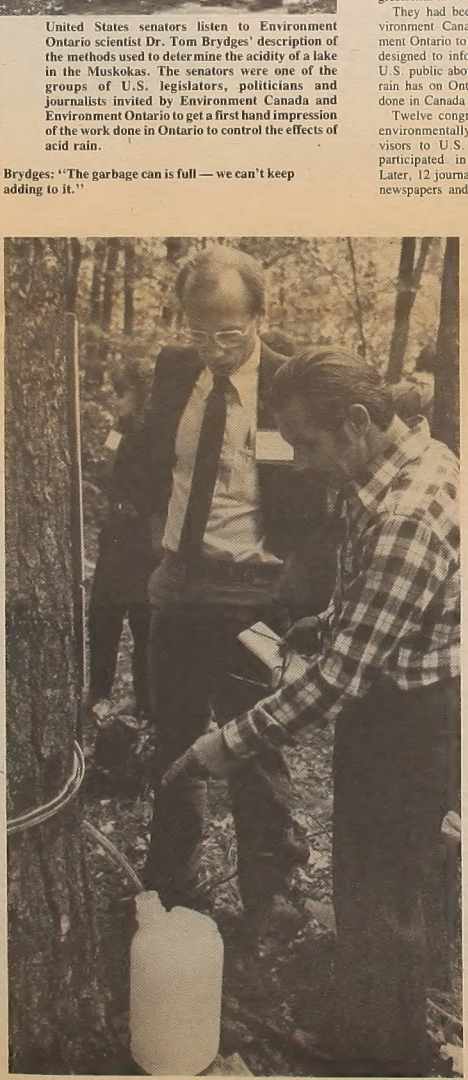
Most rec lators and ai consin, Mi York and C of the provi

All visito portunity to scientific d effects of ac ers. At Envir rain researc of Plastic La had a good field activiti

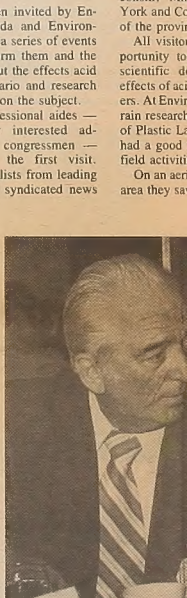
On an aer area they sa



Dave Weston, Environment Ontario scientist, explains experiments designed to determine the rate of penetration of acid rain into soil to U.S. congressional aides.



Dr. Sam Linzon, superior of the phytotoxicology section, Environment Ontario, describes his research on the effect of acid rain on vegetation.



Ohio Representative Thomas problems acid rain causes in t

An acid rain collector is the foc and U.S. journalists.

ors, journalists
d evidence of acid rain

photos: Hans Eijsenck

rom Pittsburgh, Los
t. Louis, Minneapolis,
Portland, Syracuse,
d New York spent two
Environment Canada
onment Ontario scien-

cently, 12 state legis-
aides from Illinois, Wis-
Minnesota, Ohio, New
Connecticut were guests
vincial government.
ors were given the op-
to view statistical and
documentation of the
cid rain on Ontario wat-
vironment Ontario's acid
ch station on the shores
Lake, near Dorset, they
d look at the ministry's
ities.
erial tour of the Sudbury
saw the devastation SO_2 emissions caused before the construction of Inco's tall stack — the same devastation that now threatens many Ontario waters.

At the same time, experts explained to the visitors the measures Inco and Ontario Hydro are taking to control acid rain-causing SO_2 emissions.

The exchange of ideas during the visits proved valuable to all parties involved. At the start of their trip several guests were not aware of the size and quality of Ontario's water resources. Others had little knowledge of the extent of continuing research into the acid rain phenomenon.

At the conclusion of the visits many previously skeptical Americans were much more open-minded and receptive to Canadian arguments. A few others, mainly visitors from coal-producing areas, expressed concern about the economic and social implications a curtailment of SO_2 emissions would have for their states.

The demonstration of the effects of acid rain on the Ontario environment was a continuation of the efforts of both jurisdictions to demonstrate to Canada's neighbor the impact on the shared environment.

During the past several months, Ontario has taken the initiative to U.S. courts and tribunals.

On March 12, Ontario asked the U.S. Environmental Protection Agency to disapprove requests from six states to permit 18 coal-fired plants to increase their emissions of sulphur and nitrogen oxides into the common airshed of

(continued on pg. 9)

Environment Minister Keith Norton: Weakening of U.S. air pollution controls "is close to an act of hostility on a friendly neighbour."

P. Gilmartin and area resident Sonja Holliday-Rhodes discuss the the Muskoka-Haliburton area.

U.S. congressional aides on the shore of Plastic Lake, one of the most heavily affected lakes in the Muskokas.

cus of a discussion between Ron Reid, manager of Environment Ontario's Dorset laboratory,

U.S. senators listen to an explanation of Environment Ontario's terrestrial studies.

In 1980 it was Lake Ontario's turn

by Liane Faulder

One of Ontario's most pressing environmental challenges today is that posed by toxic contaminants, said Graham Scott, speaking to a joint conference of the Ontario and American Water Associations. And maintaining the quality of the Great Lakes is a significant part of that challenge.

The Great Lakes have been through a lot. In the 70s, the Great Lakes Basin Ecosystem was buckling under decades of environmental abuse, like the dumping of raw sewage, mercury poisoning, and phosphorus overloading. The Ministry of the Environment, with the support of environmental groups, sprang to the defence of the largest fresh water system in the world.

Positive restoration steps were taken. The United States and Canada created the Great Lakes Water Quality Agreement, promising to "restore and enhance" the water quality of this shared and valuable resource. Both countries agreed upon a concerted program to restrict phosphorus emissions from municipal sewage treatment plants, at the same time discouraging the use of high phosphorus detergents. Industries discharging mercury as a waste by-product cleaned up their act. Today, only one chloralkali plant, a source of mercury discharges, remains in Ontario and its emissions are constantly monitored.

In addition, fish and gull populations now show declining levels of PCB and DDT as a result of decreased contaminant loading throughout the ecosystem. There have also been substantial decreases in organochlorine concentrations in fish in Lake Erie and Ontario. PCB concentrations have declined between 22 and 89 per cent in Lake Ontario fish samples and between 60 and 89 per cent in fish from Lake Erie. Declines are also reported for Lakes Huron and Michigan. And phosphorus loads to Lake Erie from the Detroit River have been reduced by 84 per cent since 1968.

419 toxic compounds

An Environment Ontario 1980 report on Great Lakes quality uses words like "significant upgrading" and "responding well" when discussing the present state of the Great Lakes. In Western Lake Erie, mercury contamination was reduced to a level that made it safe to remove the ban on commercial fishing in 1976. It had been predicted that it would take up to 100 years for that lake to be restored to reasonable health. And lifting commercial fishing bans on Lake St. Clair could occur soon.

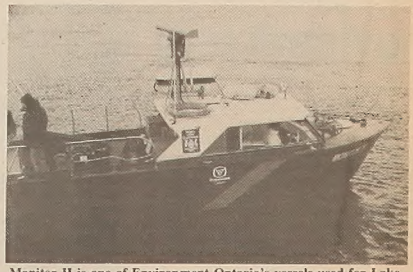
Although massive improvements have taken place, the battle is not over yet. Mercury still turns up in the flesh of fish analyzed in ministry laboratories. And while phosphorus loadings of nearshore waters have been drastically reduced, the problem still exists.

As Environment Ontario was striving to reduce these known pollutants in the Great Lakes, methods of detection improved. These improvements lead to a new and insidious discovery: toxic contamination.

Great Lakes respond well

"More than 30,000 chemical compounds are being produced by industries located in the basin and another two or three thousand are added each year," said Mr. Scott. Of these 30,000, only 419 have been identified as toxic. Some toxic substances are man-made, like dioxins; DDT and PCB. Other naturally occurring metals like mercury, cadmium and lead have increased in concentration, because of human activity. These trace metals and chemicals can accumulate in plant, animal and fish tissues, possibly affecting reproduction and perhaps causing death. And toxic substances can pass through the food chain into people.

"Lake Ontario is now the most seriously affected of the Great Lakes, because of the high degree of trace contamination in its fish," says John Kinkead, head of Environment Ontario's Great Lakes Surveys Unit. "It's one of the ministry's prime concerns today."



Monitor II is one of Environment Ontario's vessels used for Lake Ontario water quality monitoring.

Rising levels of toxic chemicals have been found in fish caught near the Niagara-on-the-Lake drinking water intake, an Ontario Environment report shows. Karl Suns, toxicologist with the ministry's water resources branch, says it's the first time since 1975 that chemical levels have risen in that area.

Environment Minister Keith Norton recently confirmed that a form of dioxin has been found in the flesh of fish in the Great Lakes, "particularly in Lake Ontario."

contaminant of the month

The governments of Ontario and New York are studying the situation and will publish a detailed joint report in the near future.

Marta Griffiths, head of the present two-year study on Lake Ontario, describes the situation as a "contaminant of the month" contest. "Reports of new contaminants are hitting the press all the time," says Ms. Griffiths. And as better research methods develop, more and more contaminants will be discovered.

Planners with the Great Lakes Basin Commission say that by 1990 testing methods will be able to detect and prevent the use of harmful contaminants before they occur. But for now the Ministry of the Environment is working at full speed to keep on top of things.

The two-year intensive study of Lake Ontario is an example of Environment Ontario's ongoing programs for the Great Lakes. There is a rotating seven-year schedule of intensive study for each of the lakes, done in addition to the regular monitoring programs.

seven year rotating schedule

There are literally thousands of water quality monitoring sites on the Great Lakes. They are moved constantly as changes occur within the lakes. Sites may serve a dual purpose, measuring both the effect of a given sewage treatment plant or landfill site, and the general water quality.

Collection and analysis is time consuming and complicated. Environmental scientists and technicians spend every day from April to November on one of the five Ministry of the Environment boats, collecting sample after sample. Some simple teting, like pH, can be done on board. Most of the samples are sent to the main lab for analysis.

At the main laboratory on Resources Road, in Rexdale, samples are analyzed for 58 different water quality variables. Last year the Lab Services Branch of Environment Ontario performed roughly 120,000 tests on the Great Lakes alone.

Ontario operates one of the few labs in the world which study the contaminant dioxin exclusively. Dioxins, very big in the media lately, are chemical substances formed as impurities during the manufacturing process of a few chemicals and are in at least one form, highly toxic minute concentrations.

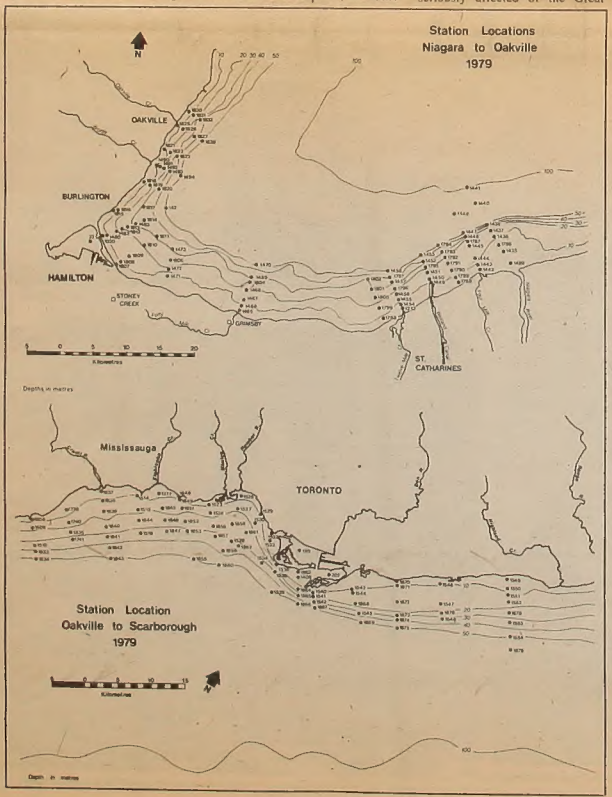
world scale toxicology centre

"The ministry is involved in a big dioxin monitoring program for fish and water right now," says Dr. Dean Smillie, supervisor of Environment Ontario's dioxin laboratory. Smillie's department is working on a project to determine whether incineration of municipal garbage may produce dioxins, as is claimed by one of Ontario's big chemical companies.

"The government of Ontario is committed to establishing a world-scale centre for toxicology, which will explore immediate and long-term solutions to industrial chemical problems — problems which now necessitate such measures as the proposed waste disposal site at South Cayuga," said Mr. Scott.

Unfortunately, research takes a long time. Because of the minute concentrations of trace contaminants, they are difficult to discover and results may contain a large margin of error, says Dr. Smillie. Dioxin, for instance, is measured in parts per trillion. One part per trillion is roughly equivalent to one second in 30,000 years.

But with approximately 1,000 scientists and technicians involved in the study of the water quality in the Great Lakes with Environment Ontario, and the federal and U.S. organizations, positive results are on the way. Says Graham Scott: "We have every expectation that, as with all the others, this problem also will be overcome."



Profiling the soils chemical balances

by Liane Faulder

The investigation of the effect of acid rain on soil is Environment Ontario's newest acid rain study project.

"It would have been great if someone had done a study on soil acidity 30 years ago," said Margaret Griffith, Environment Ontario soil specialist. "As it stands, scientists have no idea how much acid rain has changed various types of soil."

There are three parts to the study. In the first part, started in 1980, more than 100 soil pits were dug all over Southern Ontario. Eighty more were dug in 1981 to establish representative soil profiles. Samples from three major soil layers were taken in the pits to be analyzed for 30 variables.

The main purpose of these tests is to establish terms of reference for the condition of various soils in various areas as they are today.

focus on Dorset area

The second part of the project focuses on the Dorset area of Southern Ontario. Environment Ontario's phytotoxicology section, which studies the effects of pollution on plants and soils, investigated soils surrounding Plastic and Blue Chalk lakes to determine how they and the water they contain change as acid rain falls through trees and penetrates into the various soil layers.

The work is done by placing instruments called lysimeters at various depths in the ground. When it rains, the lysimeters pump rainwater from various soil depths to containers on the surface to allow scientists to determine what chemical changes occur and where.

The third part of the study is a simulated acid rain experiment on clay soils, typical forest soils and naturally acidic soils as they are found in Southern Ontario.

overall effect uncertain

Samples from major soil layers are collected and placed in funnels in a laboratory. The samples are leached with simulated acid rain of three different pH values, one acidic, one moderately acidic (representing the real rainfall in the Muskoka/Haliburton areas) and one of optimum pH value. The leachate is collected and analyzed to determine changes in the soils content of potassium, phosphate, sulphate, nitrate, aluminum and various other trade metals. Soil pH is also checked.

"What overall effects these changes in trace elements and pH have on soil is not yet certain," Ms. Griffith admits.

This experiment is the first of its kind ever conducted. Previous acid rain experiments hae not dealt with separate layers of soil. Acid rain was simply leached through intact layers of soil. "Now we'll be able to study what happened between the soil layers, as well as in an entire section of soil," says Ms. Griffith.

The study will take up to six years to complete. "Soils are very slow substances. It takes 1,000 years for a layer of soil to form in nature," says Ms. Griffin.

conditions close to nature

Conditions in the lab are kept as close as possible to those in nature. Acid rain is poured through the soil samples at a rate based on actual rainfall measurements in the Muskoka/Haliburton area.

"Similar experiments have been conducted much more quickly. But if you speed up natural soil processes, your results may not be valid," says Ms. Griffith.

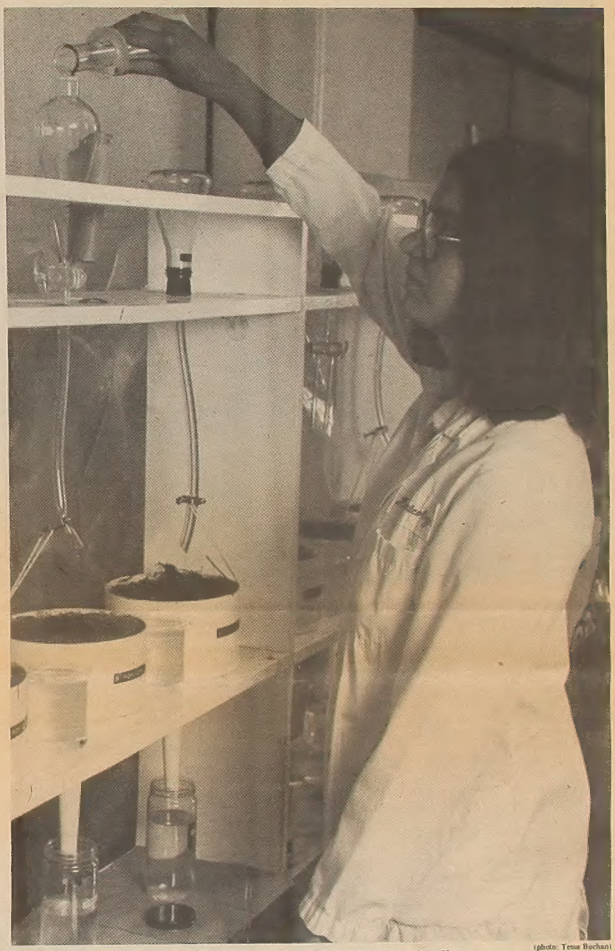
One of Environment Ontario's main concerns is that scientists have no idea how long the soils have been effected by acid rain.

"Soil will absorb a lot of sulphate — which is one of the major components of acid rain. But at some point they will become saturated, and then the sulphate will leave, or be leached from, the soils. Because soils are in a very delicate chemical balance, if one component leaves, others must as well. Important nutrients may be leached out of the soil in this way, and this would be very bad for plant life," says Ms. Griffith.

So far that hasn't happened. But scientists don't know how much more sulphate the soils can take.

"Soil studies at present are inconclusive; there's so much more we need to know," says Ms. Griffiths. As far as crops are concerned, laboratory studies have shown both good and bad effects from acid rain.

Environment Ontario's only major operational theory at present is that forest soils are more susceptible to acid rain than clay soils, which have a great buffering capacity. How this could effect Ontario's forests is yet to be determined.



(photo: Tessa Buchan)

Margaret Griffith pours diluted acid into a soil sample to determine its effect.

U.S. legislators, journalists...

(continued from pg. 7)

both countries.

On March 30, Ontario expanded its intervention to add two large power plants near Cleveland.

On April 9, Ontario sought leave to intervene in the U.S. Court of Appeals for the District of Columbia in connection with petitions from the state of Ohio and two of its utilities. These petitions attempt to prevent EPA from considering Canadian environmental effects when reviewing state emission plans.

On May 28, Ontario petitioned EPA to expand the scope of the hearings to consider international transport of pollutants.

On June 19, in Washington, Ontario presented scientific evidence under Section 126 of the U.S. Clean Air Act in support of petitions against interstate pollution brought by New York and Pennsylvania.

During the spring and summer of 1981, senior ministry officials and scientists presented Ontario's case against the rain to groups, seminars and legislators in a number of centres in the states of New York, Ohio, Minnesota and California.

The concerted federal-provincial activities have produced encouraging results. A continuation of these efforts is being considered with the aim of keeping the discussion of acid rain active and to bring its potential danger to the attention of the widest segments of the U.S. public.

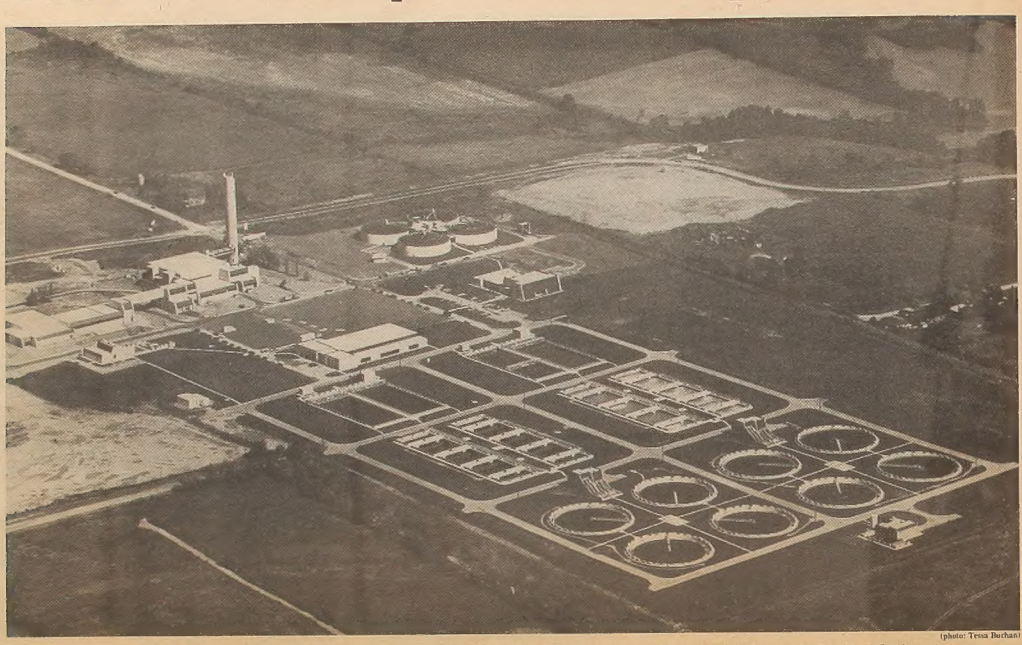
G. Mierzynski acting director

George Mierzynski has been appointed acting director of Environment Ontario's Central Region during the absence of Dennis Caplice. Caplice is attending the Department of National Defence senior officers training program from September, 1981 to August, 1982.

Mr. Mierzynski is a graduate of the University of Toronto with a B.A.Sc. in civil engineering. Upon graduation he joined the Ministry of Transportation and Communications. In 1965 he accepted a position with the Ontario Water Resources Commission, as a project engineer in the construction branch. His present position is that of chief engineer and assistant director, project co-ordination branch.

Mr. Mierzynski is responsible for all environmental matters in the Region of Peel, Halton, Durham, York, Simcoe, Muskoka, Haliburton, Victoria, Peterborough and Northumberland.

York-Durham sparks development



(photo: Tessa Buchan)

Airview shows the Duffin Creek sewage treatment plant which went on stream in October 1980 to process waste from the phase I network of the York-Durham system.

The completion of the first phase of the $300 million York-Durham sewage and water treatment system has given a strong boost to the development of the area. Development constraints, imposed by area townships because of the limited capacity of old existing systems, have been removed.

As a result, residential construction in Markham has risen from 1,109 units in 1980 to 1,494 units in the first six months of 1981.

The total new construction, including industrial, residential and commercial projects, shows the same trend. In 1980 it totalled about $190 million. During the first six months of 1981 the value of new construction projects of all types started in Markham amounted to more than $132 million.

A similar development occurred in 1981 in the Town of Vaughan.

Here, 1,348 residential units were built in 1980. From January to July, 1981, however, new residential construction grew to 1,934 units. Total construction values rose from $118 million in 1980 to $138 million in the first six months of 1981.

"This tremendous increase in construction all the way from Markham to Richmond Hill is primarily caused by the opening of the new York-Durham plant and in anticipation of the completion of the new Black Creek pumping station," said Cecil Wilson, project manager of the York-Durham project.

into as yet unserviced areas

When the Black Creek pumping station opens in 1982, an even greater expansion can be expected in the York region.

Construction of the extension of the York-Durham system into as-yet unserviced areas of Vaughan has started with the recent award of three construction contracts with a total value of $7 million by Environment Minister Keith Norton. The contracts call for the construction of the Black Creek pumping station, 2,200 metres of watermain and collecting sewers.

A 15 per cent Ontario Government subsidy is provided to assist the projects. In addition, the York-Durham sewage project receives a grant of $3.5 million from the Ontario Ministry of Municipal Affairs and Housing.

The completed first stage of the York-Durham project has a flow capacity of 40 million gallons per day. Over the next three years, about 35 miles of trunk sewer lines will be added to extend the system through the region of York and Durham and to form the largest service system ever constructed by Environment Ontario.

It will eventually have a flow capacity of 160 million gallons per day and serve a projected population of more than 800,000 people in the towns of Vaughan, Markham, Richmond Hill, Aurora, Newmarket, Pickering and Ajax.

LIMA protects Sarnia, Michigan air quality

LIMA — Environment Ontario's newest safeguard against air pollution — is designed to improve air quality both in the Sarnia area and across the border in Port Huron, Michigan, Doug McTavish, Environment Ontario's southwestern regional director, announced.

The Lambton Industry Meteorological Alert (LIMA) went into operation last spring to provide more stringent control of sulphur dioxide emissions (SO_2) from the Chemical Valley industrial area. Air monitoring stations in Port Huron, Corunna, and two in Sarnia are now recording continuous sulphur dioxide levels.

"Sulphur dioxide (SO_2) is a major pollution concern in the Sarnia area when weather conditions are unfavorable," said Mr McTavish.

The alert was devised by Environment Ontario and is enforced by a newly-filed regulation under the provincial Environmental Protection Act (151/81). The Lambton Industrial Society, an association of Sarnia area industries, installed the necessary monitoring equipment, computer and telemetering facilities at a cost of $300,000 and will maintain and operate the system.

Sulphur dioxide levels in the area are affected by two factors: A number of SO_2 emitting industries along the St. Clair River south of Sarnia and adverse weather conditions which produce sustained directional winds for extended periods which cause a gradual increase in SO_2 levels in Sarnia and Port Huron and on occasion in Corunna.

Data from four monitoring stations is telemetered to the ministry's air resources branch in Toronto along with current weather data. Should sulphur dioxide levels increase to a set level and weather conditions remain unfavorable, a meteorological officer can declare a LIMA alert and the ministry's Sarnia office notifies selected industries to cut back on sulphur dioxide emissions. During the implementation phase, five LIMAs have been declared. During those periods, the 24-hour provincial air quality objective has not been exceeded.

"The Lambton Industrial Society has acted in a responsible manner by financing and maintaining these monitoring stations," said Mr. McTavish. "If the new system should improve the air in the Sarnia area significantly, credit is due to the co-operation and effort of LIS member corporations who played a part in the development of the unique system.

"The new LIMA system is a fine-tuning mechanism designed to control SO_2 emissions from specific sources at certain times. The ministry's Air Pollution Index system, which was installed in Sarnia four years ago, is a general tool designed to measure both sulphur dioxide and particulate matter. LIMA gives us an added control over the Chemical Valley area and this will ultimately lead to cleaner air for Sarnia, Corunna and Port Huron."

Toronto rivers study

Children may go swimming in the Don River again on warm summer days if the new study started by Environment Ontario's pollution control and water resources branches in co-operation with the Metro Toronto and Region Conservation Authority achieves its goals.

The four-phase, five-year study is designed to develop a comprehensive Toronto area water management plan that would further improve the quality of water in rivers and streams running through Metro Toronto, and make these waters more suitable for aquatic life and other beneficial uses.

In the first phase of this study, water quality problems will be defined by the compilation of surface water quality and pollution source data.

Mobile lab aids two major studies

The scope of the detailed research for two major provincial studies is being widened by the completion of a large, self-contained mobile laboratory delivered to the laboratory services branch of Environment Ontario. The new lab will provide analytical support for the Acid Precipitation in Ontario Study (APIOS) and the Great Lakes Monitoring Survey.

Equipped with the most up-to-date instruments and fully independent of outside energy sources, the laboratory will be able to travel to remote areas. Its high mobility and self-sufficiency will also make it a valuable part of the ministry's emergency response capabilities.

The mobile lab is built on a 9 metre (29 ft.) GMC chassis using all-welded tubular frame construction. The chassis supports a simple but versatile and well insulated laboratory room equipped with sink, workbenches and locker space. Power for all instrumentation is supplied by two independent 4 kw gasoline-driven generators. Facilities for hook-up to external sources are also provided.

The laboratory can be heated and air conditioned, has a 200 litre fresh and a 40 litre distilled water tank and a fully insulated water supply system. For the storage and later disposal of water and sewage, two separate holding tanks are fitted.

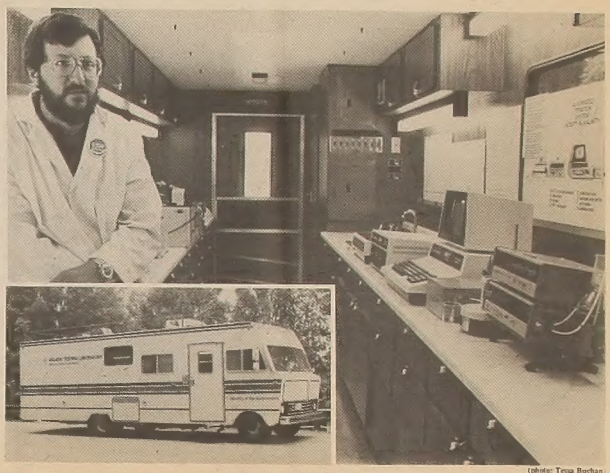
The basic instrumentation will consist of:

- Two continuous-flow colorimetric analysers for the analysis of nitrates, phenols, ammonia and other chemicals in water.
- An automated titration system for the determination of either the buffering capacity of waterbodies or the acidity level in precipitation. This instrument has been developed by the laboratory services branch of the ministry.
- An ion exchange chromatograph designed to simultaneously measure nitrates, sulphates and chlorides in water.
- Conductivity and pH measuring equipment.

Additional scientific instruments and electronic computer equipment can easily be added and plugged into one of the 24 electrical outlets provided. This may become necessary when the unit is deployed for special tasks in answer to emergency situations such as chemical spills, tank leakages, or seepages from piping systems.

The vehicle has been constructed to ministry specifications by GAC Industries Ltd. of Owen Sound and is valued at about $55,000 (without instrumentation).

The unit was co-financed from the budgets of APIOS, the federal-provincial Great Lakes Monitoring Survey and the water quality section of the ministry's laboratory services branch. Project scientist in charge of the deployment of the mobile laboratory is Frank Tomassini of the water quality section.



(photo: Tessa Bochan)

Frank Tomassini shows off the spacious interior of Environment Ontario's newest mobile laboratory (inset).

On the track of plumes

Have you tried to trace the movement of a feather in currents of air? Mathematical models of the movement of effluents in water are trying to do just that. At times they come close to reality. At others they are off.

Or does your community's apparently efficient sewage treatment plants still produce unexpected pollutant loading in near-shore areas?

A method designed to allow the precise and continuous tracking of effluent plumes in water bodies designed by Environment Ontario's water resources branch may help in the future to solve both problems.

With simple equipment mounted aboard a boat, this method is now applied for the first time to determine the movements of effluents from two Metro Toronto sewage treatment plants. The equipment measures precisely and continuously the temperature to 1/10 of a degree C. and the conductivity of the water through which the boat moves. The boat's path is determined with the aid of an electronic positioning system with an accuracy of 3 metres (10 ft.). A comparison of the data obtained within the plume of effluent and the ambient water then allows an exact determination of the movement and of the decay of the effluent.

The equipment used in the process is portable and can be installed on any of the ministry's boats. It consists basically of a hose that can be lowered from the boat to various depths and a pump that supplies a continuous flow of water to temperature and conductivity measuring instruments.

Data measured by both instruments are continuously recorded on a strip chart. Measurements of the two parameters at various depths can then give a three-dimensional image of the effluent plume. Water samples are easily obtained from the pumping system for the analysis of other contaminants.

One important application of the device is the delineation of mixing zones associated with effluent discharges to the Great Lakes. The mixing zones can be determined under different meteorological conditions. Although the equipment is now used to measure the effluent plume from sewage treatment plants, it can as well be used to determine the movement and the decay of effluent plumes from industrial operations or the dispersion of river discharges. Data collected by the plume tracking method will also assist in improvements to the mathematical models for effluent movements.

"All mathematical modelling is based on a number of assumptions," project leader Yousri Hamdi of Environment Ontario's water resources branch said. "The new system will allow us to basically determine the rate of dispersion and decay of plumes in the field and compare it with our mathematical models."

SAMU watches from new location

SAMU — Environment Ontario's computer involved in the control of air pollution in downtown Toronto — has recently moved from 67 College St. to a new home at Bay and Breadalbane. The Stationary Air Monitoring Unit continues to sample great gulps of air and to register data for the determination of Ontario's Air Pollution Index (API).

"Most people are familiar with API broadcasts, but few realize its significance in controlling pollution, maintaining a safe and healthy air quality and keeping our skies clear," said George Mierzynski, acting director of Environment Ontario's central region.

The API is based on the 24-hour average concentrations of sulphur dioxide and particulate matter in the air and has been used in Ontario since 1970.

The index covers a range from 1 to 100. A reading under 32 is safe. But when the index reaches 32, the ministry issues an alert to operators of major local pollution sources to prepare to cut back on their operations. They usually take action with the warning, but at 50 they are ordered to reduce their emissions. At 100 the operation of any source that isn't vital to public health and safety can be stopped by ministry order.

In 1970 there were 17 occasions when the pollution of the air, combined with adverse weather conditions, forced an alert situation. In 1979 there were two such episodes. In 1980 there were none. Sulphur dioxide levels in Metro Toronto have been reduced by 80 per cent and particulate levels by 50.

"In Toronto, the index has never exceeded 62," said Mr. Mierzynski. "Ontario is the only place in North America to operate this kind of control system."

Since SAMU began operations, a remarkable improvement has taken place in Toronto's air quality.

"Toronto's air is very clean for a city of its size," said Mr. Mierzynski. "This is because we're now able to detect when meteorological conditions might combine with emissions to cause a problem — and stop it before it occurs."

hourly reports on soiling index

These improvements are a direct result of SAMU. SAMU examines several different indicators in air samples. First, it keeps a 24-hour watch on the sulphur dioxide levels. (Sulphur dioxide was chosen as a good indicator of changes in other gaseous pollutants, such as carbon monoxide.) Second, SAMU monitors particulate matter in the air, and records this information as the soiling index hourly.

Particulates — dust — are produced by nearly all combustion and industrial processes. They are responsible for things like soiling, corrosion and damage to clothing, property and vegetation. They can cause respiratory problems, and may even include toxic substances.

Both the soiling index and the sulphur dioxide readings are fed continuously into computers at the air resources branch of Environment Ontario to form the API.

SAMU also monitors ozone levels. Excess ozone can result in vegetation damage. It keeps a steely eye focused on hydrocarbons, carbon monoxide and nitrogen oxides emitted from cars. The levels of these depend on traffic patterns.

SAMU gets help in the battle against downtown air pollution from eight high volume air samplers located on the roof at Bay and Breadalbane. They collect particulate matter in the air on a filter, which is sent daily to Environment Ontario's main laboratory in Rexdale to be analyzed for heavy metals, lead, arsenic and a number of other contaminants. Because it is highly visible, particulate matter is what most people identify as pollution.

There are SAMUs in every major centre across Ontario, each one valued at $150,000.

LD50 under siege

The LD50 test, used by biologists to determine the presence and the toxicity of pollutants, has come under the severe criticism of supporters of the British Animal Society. LD stands for "lethal dose".

In the test, a number of animals are submitted to various concentrations of the suspected substances to determine at what concentration more than 50 per cent of the animals die.

Supporters of Animal Aid decided to picket laboratories in England that use the test, and expect support for their protests in Europe, Australia, New Zealand, South Africa and the U.S.

They claim that about half a million animals were killed in Britain in 1980 in such tests, the tests don't give precise measurements of toxicity, and the results cannot be applied to man.

"Case Against the Rain" wins Forum award

"Case Against the Rain", an 18-minute videotape produced by Environment Ontario's information services branch, won first prize in the audiovisual film under $30,000 cost category in a competition held by Forum, the organization of Ontario Government communicators.

The Forum competition is aimed at encouraging and acknowledging excellence and the creative skills of government information staff. Environment Ontario's award was presented at Forum's annual meeting to R.J. Frewin, information services branch director.

"Case Against the Rain grew out of an experiment," said Hans Eijsenck, manager of the creative services section of the branch, and director of the production.

"During an acid rain research project in the Sudbury area in 1979 an Experience '79 student crew took some film footage of the activities. When I saw the material, I felt that with additional work a short program showing the ministry's efforts could be documented."

"Mary Ellen Lewis, a summer student employed in our branch, wrote a suitable script, and we started the additional shooting in February, 1980."

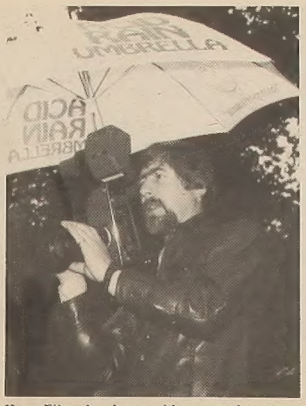
Work with the videotape equipment was a new experience for Mr. Eijsenck. It is basically similar to work with 16 mm film equipment, with which he is familiar. But the videocamera's sensitivity to image contrast and to poor lighting conditions, the electronics involved, sound recording and other details are different.

"We learned a lot while working with the new medium, and the results were very rewarding," Mr. Eijsenck said.

The tape was originally intended for in-house use and as a speaker's aid. When editing was completed, however, director Frewin found that the tape deserved wider distribution.

Since its completion in May of 1980, "Case Against the Rain" has been shown to a large audience on Canadian regular and cable TV stations. Excerpts from the tape have been shown on U.S. TV networks, among them on ABC's "Good Morning America" show. In addition, copies were requested by organizations in Canada and the U.S. and shown at environmental meetings, to schools and in camps.

In 1981 the tape has been updated to reflect the newest developments in Ontario's battle against acid rain.



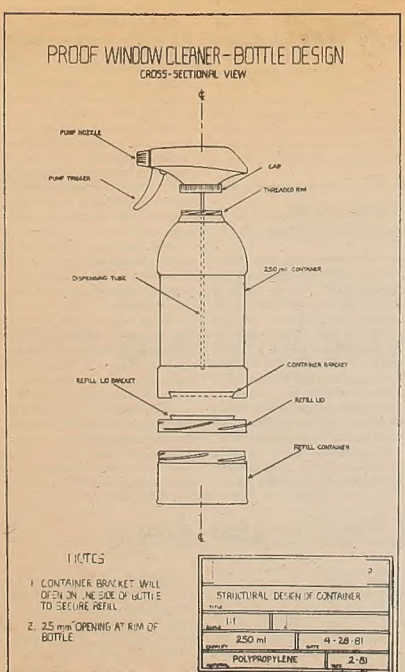
Hans Eijsenck, shown with appropriate prop, directed the award winning film "Case against the Rain." (photo: R. Kurli)

Mary-Ellen Lewis, a summer student employed by Environment Ontario, developed the successful script. (photo: Tesia Buchan)

While "Case Against the Rain" concentrates on the activity of the ministry, a 16 mm film, "Crisis in the Rain", presenting a more general outlook on the subject and its international implications, has been produced for Environment Ontario by a commercial producer, Montero-Fulton Inc.

Both film and videotape are available to schools and organizations from Modern Talking Pictures Service, 143 Sparks Ave., Willowdale, M2H 2S5.

Environmental packaging contest winners



The diagram shows the award winning design concept of James Douglas Gibson. Window cleaning liquids are generally sold in throw-away containers. Gibson's approach features a detachable bottom so that pouches of concentrate can be inserted for mixing with water.

Winners have been selected for this year's Ontario Environmental Packaging Design Competition, established by Environment Ontario in co-operation with the Waste Management Advisory Board and the Packaging Association of Canada.

The competition is held every two years in conjunction with Pac Ex, the association's trade show at Exhibition Place, Toronto.

Its aim is to encourage designs which will reduce waste. More than a third of the domestic garbage in Ontario landfills is discarded packaging material.

This year's competition attracted 33 entries from students of industrial design at Carleton University, Ottawa, and Humber College, Toronto. The entries were judged by representatives of Environment Ontario, the WMAB, PAC and industry experts.

awards of $250 to $750

Awards range from $750 for first to $250 for honorable mention. Equal amounts are given to the student and his school.

The following prizes were awarded:

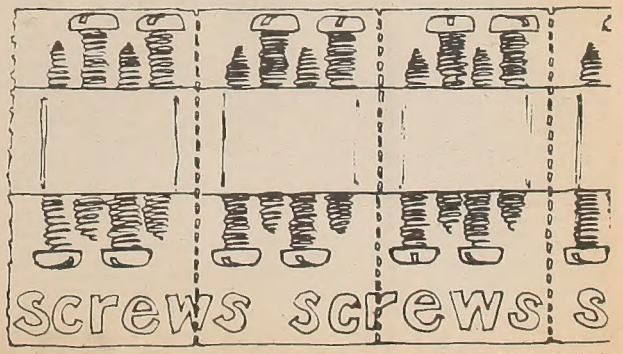
First prize to James Douglas Gibson, Humber College, for the development of a packaging system for a glass-cleaning product.

Second prize to Jonathan Vinden of Carleton University for a novel packaging system for small hardware items.

Honorable mention to Adam Szmuklerz of Humber College for the re-design of packaging for Airwick Stick-Ups.

Honorable mention to Kenroy Harrison of Carleton University for re-design of the container for Ajax powdered cleanser.

Special award was also given to the School for Industrial Design, Carleton University, for the overall excellence and the integrated presentation of the competition entries.



Jonathan Vinden's entry suggests the placing of small hardware items on continuous, perforated paper strips that allow the sale of small quantities. The system replaces the wasteful extruded plastic bubble packages now used.